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ANTIMONY TRIOXIDE

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OFFICE OF TOXIC SUBSTANCES REV. 7/27/82

CODING FORM FOR GLOBAL INDEXING

Microfiche No. (7) •	206062	1	No. of Pages		2
Doc I.D.	8782108 12	3	Old Doc I.D.	8 DS	4
Case No.(s)	OTS 84003A			—	5
Date Produced (6)	032845	6	Date Rec'd (6)	012983	7
Conf. Code •	N	8			

Check One: ☐ Publication ☐ Internally Generated ☑ Externally Generated

Pub/Journal Name 9

9

Author(s) 10

Organ. Name 11

UNION CARBIDE CORP

Dept/Div 12

CORP HEALTH SAFETY & ENVIR AFFAIRS DEPT

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City DANBURY 15 State CT 16 Zip 06817 17 Country 18

MID No. (7) 19 D & B No. (11) 20

Contractor UNIV OF PITTSBURGH 21

Doc Type 22

• RI • UP • MEASD BD SUHSFN

Doc Title 23

THE SINGLE DOSE AND SUBACUTE TOXICITY OF ANTIMONY OXIDE (SB_2O_3)

WITH COVER LETTER

AK 5/20/83

Chemical Name (300 per name)	25	CAS No. (10)	24
ANTIMONY TRIOXIDE		1309-64-4	

1

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD, DANBURY, CT 06817
Corporate Health, Safety and Environmental Affairs Department

RECEIVED
JAN 29 1983

January 28, 1983

U.S. Environmental Protection Agency
TSCA 8D-1
P.O. Box 2060
Rockville, Maryland 20852

Subject: Union Carbide TSCA Sec. 8(d) Rept., 40 CFR 716.6 & 716.7

Sirs:

With respect to:

Chapter I of Title 40 of the Code of Federal Regulations;
Subpart A, Secs. 716.6 (a)(1) and 716.7 (a)(1) and (2);
Federal Register, Vol. 47, pp. 38791 and ff., Sept. 2, 1982;
Sec. 9(d), Pub. L. 94-469, Stat. 2029 (15 U.S.C. 2607 (d);

Union Carbide Corp. herewith submits the attached copies of studies and lists of studies in compliance with the above-identified regulation.

Union Carbide Corp. was granted an extension of 60 days to comply with the original December 3, 1982 deadline, pursuant to 40 CFR 716.14. A copy of the letter from Dr. J.A. Todhunter of the EPA to me of November 26, 1982 notifying Union Carbide of the extension is enclosed.

There is not information in the enclosed copies of studies or lists of studies for which Union Carbide asserts claims of confidentiality. The printed words "BUSINESS CONFIDENTIAL" or "Confidential" at the top of pages for most reports was for the internal guidance of Union Carbide personnel at the time of report issuance and does not represent a Union Carbide Corp. claim for confidential handling of the information, submitted pursuant to TSCA Sec. 8(d) rules.

Where some lines are deleted from certain reports, especially earlier ones, it is solely due to the fact that the deleted information pertains to chemicals or substances other than those for which reporting is required under the above rule. Union Carbide has included copies and lists of studies for only those chemical substances that are members of categories which it has manufactured or processed since 1972. Union Carbide Corp. hereby asserts that

the enclosed copies of studies and lists of studies represent all of the studies which Union Carbide's extensive file search has identified to date as reportable under the above-identified rule.

The Environmental Protection Agency and other appropriate government agencies are free to use the enclosed information as necessary in the normal discharge of their mandated responsibilities. However, identified authors, whether employees of Union Carbide or elsewhere, or their organizations are the rightful owners of the publication rights of the contained information.

If you have questions concerning the enclosed reports and lists of studies, or wish to request further basic underlying data pertinent to the studies, please contact me or Dr. Donald L. Heywood (203-794-5224) of this Department.

Very truly yours,

Jackson B. Browning, Director
Health, Safety and Environmental Affairs
203-794-5227

JBB:DLH:jsh

8782108/2

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R: 3-28-45 RKG 3/28/45

Report 8-36

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

[illegible] copies made 6
[illegible] copies mailed 2 by ME
Date of mailing 4-5-45 A. G. CRANCH
Addressed to [illegible]

The Single Dose and Subacute Toxicity of Antimony Oxide (Sb_2O_3)

Tables of Protocols Attached

Carbide and Carbon Chemicals Corporation   Industrial Fellowship No. 274-8

Antimony Oxide is the thirteenth ingredient to be studied in our program for investigating components which may be suitable for plastic food containers. Methods were outlined in the report on Stabilizer D-22 dated 6-21-44

Bradley and Frederick, Industrial Medicine (Indust. Hyg. Sect.) p.15 to 22, April 1941 reported upon the toxicity of some antimony compounds. They reported the single dose intraperitoneal LD_{50} of Sb_2O_3 to be 3.89 gm./kg. for white rats, and the oral LD_{50} of potassium antimony tartrate to be 0.03 gm./kg., the latter expressed in terms of the contained antimony. It is clear from this that antimony is quite toxic if it is in a soluble form but that the oxide does not dissolve readily in the rat body. Rats survived 6 months of the tartrate by mouth at a dosage of 0.001 gm.Sb./kg./day indicating little cumulative power. Growth was normal but leucocytosis was observed and a mild liver and kidney injury resulted.

Single Dose Toxicity

We were unable to kill any rats with single oral doses of 20 gm./kg. fed as a 50% suspension in 1/4% agar. The animals gained weight well.

Sub-acute (30-day) Doses

Groups of male albino rats received the oxide in their diet for 30 days. Table 8-25 gives a summary of the results.

Table 8-25

Results of 30-day Oral Doses of

Antimony Oxide Administered to Rats

Concentration in diet (%)	1.8	0.45	0.10	0.00
Grams diet eaten per rat per day	8.38*	10.00	11.83	14.24
Dosage in gm./kg./day	1.07	0.27	0.06	0.00
Average weight change per rat in grams	+60.4*	+81.9	+122.2	+105.1
Final body length in mm.	202.7	207.6	214.7*	195.6
Fat index (gm. per mm. body length)	91.3	100.8	103.3	103.5
Liver weight (% of control, corrected for length)	107.2	103.4	105.5	100.0
Kidney weight (% of control, corrected for length)	93.2	95.9	104.2	100.0
Total rats	10	10	10	10
Uninfected rats	10	10	9	10
Toxic deaths	0	0	0	0
Sets of tissues examined	10	10	0	5
Sets showing any pathology	1	0	0	0
Antimony in liver as ppm. of dry tissue	283.2	130.3	42.9	0.0
Standard deviation	82.0	44.7	9.8	-
Average percent of antimony in diet which was stored in liver	0.02	0.03	0.04	-
Average red blood cell count at sacrifice in millions per cu. m.m.	7.84*	7.48	7.03	6.52
Average hemoglobin at sacrifice in gm./100 ml.	12.4	14.0	14.2	13.8

* Statistically significant difference from control group.

The group receiving the greatest dosage (1.07 gm./kg./day) ate significantly less than did control animals, grew less, and had a higher red blood cell count. One of these rats had minor cloudy swelling in the kidney

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but otherwise the pathology of all rats was normal. There was some tendency for all rats receiving antimony to grow more than did the controls, as shown by body length, but this was significant statistically only in the case of those on the lowest dosage, 0.06 gm./kg./day.

Antimony was estimated by a modified Gutzeit method in liver, kidney, brain, and long bone. In only the livers was more than a trace of the metal found. But even in the livers, whose antimony concentration was as high as 375 p.p.m., the portion stored out of the amount taken with the food was negligible, under 0.04% in each case. It seems probable that this low value was due to poor solubility in the digestive tract. The one rat showing cloudy swelling in the kidney was also the one with the greatest amount of antimony in the liver.

We found no effect from 0.27 gm./kg./day of the oxide.

Summary

Our sample of antimony oxide had a low acute and chronic toxicity for rats, probably because of slight solubility. It appears to have been considerably less toxic and therefore less soluble than the sample studied by Bradley and Frederick. It is not unusual for different samples of an oxide to differ appreciably in solubility due to differences in crystal structure but no x-ray diffraction measurements were made to define the structure of our sample.

If antimony oxide acts as a stabilizer for vinyl resins by accepting hydrochloric acid to form antimony trichloride, it seems likely that feeding tests on the oxide may be inadequate to judge the safety of its use in contact with foods. A hydrated oxide or oxychloride formed by contact of the trichloride with water might be considerably more soluble and therefore more toxic than the oxide as it is added to the film in manufacture.

Nevertheless our screening tests with antimony oxide are sufficiently promising to justify further study of the stabilizer.

Henry F. Smyth, Jr.

H. F. Smyth, Jr. SENIOR INDUSTRIAL FELLOW

Walter L. Thompson

Walter L. Thompson INDUSTRIAL FELLOW

Typed: March 28, 1945 - met

OFFICE OF TOXIC SUBSTANCES REV. 7/27/82

CODING FORM FOR GLOBAL INDEXING

Microfiche No. (7) •	206062	1	No. of Pages	2			
Doc I.D.	8782140813	3	Old Doc I.D.	8DS	4		
Case No.(s)	OTS 8400003A		-	5			
Date Produced (6)	6	Date Rec'd (6)	7	Conf. Code •	8		
110678		012983		N			

Check One: ☐ Publication ☐ Internally Generated ☑ Externally Generated

Pub/Journal Name	9
	9
Author(s)	10
Organ. Name: UNION CARBIDE CORP	11
Dept/Div: CORP HEALTH SAFETY & ENVIR AFFAIRS DEPT	12

P.O. Box	—	13	Street No./Name	OLD. RIDGEBURY RD	14		
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MID No. (7)	—	19	D & B NO. (11)	—	20		

Contractor: UNIV OF PITTSBURGH	21
Doc Type: • RI • UP • HEASD 8D 3U HS FN	22
Doc Title: ANTIMONY TRIOXIDE RANGE-FINDING TOXICITY STUDIES	23

Chemical Name (300 per name)	25	CAS No. (10)	24
ANTIMONY TRIOXIDE		1309-64-4	

A.K 5/20/83

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"UNION CARBIDE 801"
January 28, 1983
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Project Report 41-153
4 Pages
November 6, 1978
Tel: (412) 327-1020

CHEMICAL HYGIENE FELLOWSHIP
Carnegie-Mellon Institute of Research
Carnegie-Mellon University
4400 Fifth Avenue
Pittsburgh, PA 15213

Antimony Trioxide

Range-Finding Toxicity Studies

Sponsor: Union Carbide Corporation

* * * * *

Summary

Stomach Intubation, rat - LD50 > 20.0 gm/kg; 1 ml = 0.3 gm in corn oil.

Skin Penetration, rabbit - LD50 > 8.0 gm/kg; 1 ml = 0.5 gm in corn oil.

Uncovered Skin Irritation, rabbit - None from 50% in mineral oil.

Eye Injury, rabbit - None from powder or 50% in mineral oil.

Interpretation

Antimony trioxide had an extremely low order of toxicity following single stomach intubation and was no more than slightly toxic following single covered dermal application. Administration of a 50% suspension in mineral oil resulted in no irritation to rabbit skin or eyes. Instillation of the dry powder resulted in no corneal injury in rabbit eyes. Results of a 30-day feeding study appeared in Report 8-36 (1945). In this study, minor effects were noted at 1.07 gm/kg/day; none were seen from 0.27 gm/kg/day.

Sample

Quantity: 200 gm Date Received: 7-25-78 CHF Sample No.: 41-273

Submitted By: K. G. Weinberg Division: Chemicals and Plastics Tarrytown, NY

Description: White powder Charge No.: 09796

Peroral, Single Dose to Rats

LD50 > 20.0 gm/kg; 1 ml = 0.3 gm suspension in corn oil.

Conditions - Standard. See attached page of standard test procedures.

Dosage; ml/kg	Dead / Dosed	Days to Death	Weight Change	Signs
20.0	0/5	-	98 to 119 gm	Pilo-erection 1 hr.; diarrhea 3.75 hr.; fur wet 1 day

Gross Pathology - Nothing remarkable.

Conclusions - Extremely low order of toxicity following acute peroral intubation

Skin Penetration, Single Dose to Rabbits

LD50 > 8.0 gm/kg; 1 ml = 0.5 gm suspension in corn oil.

Conditions - Standard. Dosed in fume hood.

Dosage; gm/kg	Dead / Dosed	Days to Death	Weight Change	Skin Irritation	Signs
8.0	1/6	4	-225 to 408 gm	Edema	1 rabbit with unsteady gait at 24 hr.

Gross Pathology - Victim severely autolyzed. In survivors, nothing remarkable.

Conclusions - No more than slightly toxic following acute covered dermal application.

Skin Irritation, Rabbit, Uncovered

Conditions - Standard. Dosed in mineral oil.

Conclusions - No irritation on 5 rabbits from a 50% suspension in mineral oil.

Eye Irritation, Rabbit

Conditions - Standard. Dosed as a solid in mineral oil.

Conclusions - No corneal injury on 5 eyes from 40 mg per eye of the powder or from 0.5 ml per eye of a 50% suspension in mineral oil.

Roy C. Myers

Roy C. Myers, B.S.
Associate Scientist

Elton R. Homan

Elton R. Homan, Ph.D.
Manager

Carrol S. Weil

Carrol S. Weil, M.A.
Chief Toxicologist

Approved:

G. Arthur Webb

G. Arthur Webb, Ph.D.
Director

Acknowledgements:

Single Peroral Tests	Robin A. Turney, B.S. Technologist
Skin Penetration, Skin and Eye Irritation Tests	Naomi I Condra, B.S. Scientist

Date: November 8, 1978

Typed: dp

CERTIFICATE OF AUTHENTICITY

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